



West Nile Virus in New York City

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In 1999, a cluster of encephalitis cases was detected in New York City. The city applied larvicide to standing water and aerially sprayed pesticides to control adult mosquitoes. The causative agent was West Nile virus, a type of encephalitis that had never before been transmitted in the western hemisphere. This experience offers many lessons for the practitioners of public health and of public health law. A public health infrastructure that does not lose sight of the old threats must be maintained. The public health and environmental governmental establishments must work together. Law is closely intertwined with policy and programmatic initiatives and can facilitate a better public health outcome. (*Am J Public Health*. 2002;92:1218–1221)

IN LATE AUGUST 1999,

a cluster of encephalitis cases was detected in Queens County, New York City, through the fortuitous combination of early notification to the city Department of Health (CDOH) by a treating physician and amazing detective work on the part of city epidemiologists.¹ Quick consultations ensued between the CDOH, the state Department of Health, and the federal Centers for Disease Control and Prevention (CDC). In the days that followed, those discussions were expanded to include the mayor's Office of Emergency Management, the state Department of Environmen-

tal Conservation (DEC), and the federal Environmental Protection Agency (EPA).

By September 3, when both the state Department of Health and the CDC had reported that the affliction was most likely St Louis encephalitis, it was clear that we were dealing with a mosquito-borne disease. The city responded immediately by applying larvicide to standing bodies of water and by spraying an organophosphate pesticide in northern Queens by helicopter to control adult mosquitoes (i.e., an "adulticide"). A few weeks later, the causative agent was determined to be West Nile virus (WNV), a type of encephalitis that had never before been transmitted in the western hemisphere. In 1999, 5 of the 45 hospitalized patients infected in New York City died, and the region experienced a total of 59 hospitalized WNV cases, resulting in 7 deaths.

New York City's experience as the epicenter of WNV at the turn of the century—as it had been the epicenter of AIDS in the 1980s, of an epidemic of tuberculosis in the 1990s, and more recently of terrorism, including bioterrorism—offers many lessons for the practitioners of public health and of public health law. As with tuberculosis, WNV reminds us all of the need to maintain a public health infrastructure that does not lose sight of the old threats, and of how they were

brought under control, even in the face of new emerging threats such as bioterrorism.

Nuisance control and abatement is one of the oldest public health mandates, and one of the most traditional uses of the police power to protect the public from an individual's neglect or abuse. Controlling WNV requires the reengineering, reinvigoration, and relearning of nuisance control practice and of its underlying laws, all in an age of needed environmental conservation. Indeed, WNV has forced the governmental public health and environmental establishments to work together in ways that have sensitized both to the importance of the other's role. In the end, the mission of both, as with all of government, is similar and complementary: to provide for the health, safety, and welfare of the public.

In a modern society, public health initiatives, no matter how justified and necessary, are likely to be scrutinized and challenged, both in the media and in the courts. The proliferation of federal, state, and local agencies since the 1960s, and the laws and regulations that go along with them, means that there is much more jurisdictional overlap among governmental entities than ever before. Perhaps the most fundamental lesson of the WNV experience is the reaffirmation of the fact that today's public health practitioner cannot

implement public health policy and interventions without sound legal advice that is cognizant of not only the nuances of traditional public health law but also of the law that governs kindred agencies. In effect, public health law is broader and more complicated than in the past.

The following case study of WNV in New York City is a compendium of those programmatic initiatives and public health interventions that required legal analysis and advice in order to be successfully implemented. I hope that it also shows how law, instead of being an obstacle to sound policy, can be a vehicle that facilitates a better public health outcome.

THE FIRST RESPONSE

When the outbreak of WNV occurred, neither the mayor nor the governor declared a state of emergency as authorized by state law,² and the city Board of Health did not declare a state of great and imminent peril pursuant to the City Charter³ or an emergency under the city health code.⁴ Rather, pursuant to a City Charter provision that allows agency heads to declare an emergency as a means of expediting the purchase of goods and services,⁵ the Office of Emergency Management and the city's purchasing agency declared a procurement emergency in order to immediately acquire



the necessary chemicals, equipment, and the services of licensed applicators.

Normally, the State Environmental Quality Review Act (SEQRA), part of New York State's Environmental Conservation Law, would require a governmental entity, in contemplating an action that may have a significant impact on the environment, to conduct an environmental review before aerially spraying a pesticide citywide.⁶ However, regulations promulgated under SEQRA specify that "emergency actions that are immediately necessary . . . for the protection or preservation of life, health, property or natural resources" do not need prior review.⁷ Therefore, aerial spraying could proceed. Indeed, the city's judgment that spraying was immediately necessary to protect health seems to have been borne out. No human WNV infections were found in New York City in 1999 whose onset began after the citywide adulticide initiative was completed, while cases continued to occur in nearby counties that chose not to spray until later.⁸

In February 2000, state and city health department plans for the upcoming season were issued. Those plans contemplated the aggressive elimination of water accumulations conducive to mosquito breeding and extensive application of larvicide to standing bodies of water, including all catch basins in the city, of which there are at least 135 000. The plans also provided for the possibility of spraying adulticides into the air to kill mosquitoes.

Compliance with the laws and regulations applicable to use of adulticides, such as adherence to restrictions specified in the EPA-approved labels associated with each such pesticide, was the focus of much programmatic planning and legal research.

ENVIRONMENTAL REVIEW

The CDOH realized that the application of pesticides, whether to kill mosquito larvae (larvicides) or adult mosquitoes (adulticides), would require interaction and cooperation with the state DEC to a degree it had not experienced in the past. A corollary was that the General Counsel's Office of the CDOH had to quickly develop its expertise in state environmental laws and regulations. The CDOH began the process of subjecting its public health plans to an "environmental review." In the language of SEQRA, a "negative declaration" was issued by the city health commissioner with regard to larvicides, meaning that a de-

termination was made that using larvicides presented no significant risk to the environment. The use of larvicides could therefore proceed with no further environmental review.

With regard to adulticides, however, the "health-health" tradeoff was not so easy to determine. While the risk of viral infection was relatively clear, the danger to the environment, including people, from aerial pesticides could not be said to be insignificant without further study. Therefore, a "positive declaration" to that effect was issued relative to adulticides. This meant that a long and protracted process would have to be undertaken to study the effects of adulticides on humans and on natural resources, resulting in an environmental impact statement and a finding.

An environmental impact statement that analyzed the widespread use of adulticide in a large urban setting had never before been undertaken. Increasing the complexity of the analysis

was the fact that New York City is a rich and varied natural habitat, with miles of shoreline, wetlands, and sensitive areas. Considering the requirements of the environmental impact statement process under SEQRA, such as multiple public hearings in the various affected areas of the city, it was clear in early 2000 that this particular statement was going to be lengthy.

The CDOH declared a procurement emergency, approved by the city's corporation counsel and comptroller, and entered into a contract with an environmental consulting firm to assist the department with the environmental impact statement. The process, begun in March 2000, was concluded in July 2001 and produced the most elaborate analysis of this issue to date. The statement concluded that the use of pesticide to control adult mosquitoes in the manner applied by the city did not present a significant risk to the natural resources of the environment or to the public health. However, the length of the process meant that the emergency exception in the SEQRA regulations had to be invoked again to support the adulticide spraying that took place in the summer of 2000.

NUISANCE CONTROL

While the CDOH was engaged in its new, more intense review of its public health activities from an environmental perspective, it also knew that mosquito control required the use of more traditional public health authorities—the declaration, prohibition, and





abatement of nuisances. As stated above, the CDOH had to learn new lessons and revisit old ones.

With regard to standing water, the city health code had long prohibited water accumulations as a means of minimizing vermin and associated nuisances.⁹ However, issuing notices of violation to property owners or others who controlled premises, returnable to an administrative tribunal and resulting in a monetary fine, was not an adequate remedy under the circumstances. Therefore, in a demonstration of its extraordinary police powers, the New York City Board of Health, on April 18, 2000, adopted, pursuant to the authority vested in it by a series of local laws,¹⁰ a resolution that (1) declared water accumulations to constitute a public health nuisance, (2) determined that such conditions existed citywide, (3) ordered all owners or other persons in control of property to immediately eliminate all water accumulations and the conditions that create them, and (4) authorized and directed the CDOH to take all steps necessary to abate the nuisances directly if the responsible individuals failed to comply with the board's order within 5 days after being served the order.

One of the above-cited local laws authorized service of the resolution upon all persons by publication for 3 consecutive days in newspapers of general circulation.¹¹

Using the authority of the Board of Health resolution, an inspector finding a water accumulation could, for example, test for the presence of larvae and apply

larvicide or, if possible, immediately abate the nuisance by removing the cause of the condition, such as discarded tires. In addition, if the condition could not be immediately abated because extensive cleanup was required, such could be arranged on an expedited basis. The cost of the city's abatement could then be recouped from the property owner through the imposition of a lien added to the owner's real property tax bill. The board's resolution has been successfully used in petitioning the courts to issue access warrants, on an *ex parte* basis, allowing the city to tear down barriers so that cleanup can occur.

In addition to dealing with environmental laws with regard to the environmental impact statement process, the use of pesticides for mosquito control now required the CDOH to deal with state DEC as a regulator. In New York State, the application of pesticides to water requires the issuance of a permit by the DEC.¹² While a permit is not required to apply aquatic pesticides in typical bodies of stagnant water less than one acre in size, such as abandoned residential pools, it is required to apply larvicides to the catch basins that flow out into the waters of the state. Accordingly, in another manifestation of the new interaction between the CDOH and the DEC, such permits were obtained in March 2000.

Despite all of these efforts to minimize the mosquito population, the first human case of WNV in 2000 was confirmed in July. Again, following CDC rec-

ommendations, the city decided to apply pesticide to control adult mosquitoes. The city already had a contract in place with a major pesticide manufacturer and applicator that covered both larvicides and adulticides.

LITIGATION

As soon as it announced its decision to spray adulticide, the city was sued in federal court by a coalition of organizations and individuals, represented by an environmental law clinic of a local law school, seeking to enjoin the city from spraying. The coalition claimed that the city had violated the federal Clean Water Act and the Resource Conservation Recovery Act. Its motion for a preliminary injunction was denied after a hearing at which experts from the CDC, the CDOH, and the state DEC testified, and the city was allowed to spray on schedule. The litigation progressed to a full hearing in September 2000; on September 25, the federal district judge dismissed all of the plaintiff's claims except for one under the Clean Water Act.¹³ That decision was appealed to the Second Circuit Court of Appeals and on June 5, 2001, it was unanimously affirmed.¹⁴ As of this writing, the litigation continues regarding the one remaining Clean Water Act claim.

PESTICIDE REGULATION

It is undisputed that, in New York State, the DEC regulates all aspects of pesticide use, to the extent that there is no room for

local regulation.¹⁵ It does so through various provisions of state law, such as the ones providing for aquatic pesticide permits. There are also laws, implemented by the DEC, governing the application of pesticides in freshwater and tidal wetlands or in areas adjacent to them.¹⁶ These articles of the state Environmental Conservation Law contain sections that seem to exempt their application to public health activities.¹⁷ Notwithstanding these laws that seemed to keep the fields of public health and the environment separate, the city wanted to work cooperatively with all interested parties, especially the preeminent governmental agency in New York with regard to pesticides, and indeed welcomed the DEC's advice. The 2001 "mosquito season" saw the city again focusing its efforts on larvicides and eliminating the conditions conducive to water accumulations, but it did have to spray adulticide 6 times. The evolving relationship between the 2 departments resulted in the CDOH obtaining DEC permits not only to apply larvicides generally but to apply larvicides and adulticides to areas adjacent to freshwater wetlands.

CONCLUSION

The lessons of WNV are manifold. It has been a reminder of the importance of maintaining a sound public health infrastructure. Mosquito control is one of the oldest public health activities, both for disease prevention and nuisance control. It requires both government and the citizenry to



constantly work at the removal of water accumulation and the conditions that are conducive to it or to mosquitoes, such as the inappropriate disposal of tires. WNV has clearly shown the direct link between nuisance abatement and disease prevention, and it has demonstrated the value of exercising the police power against individuals or entities, such as irresponsible property owners, to protect the general public. It has demonstrated that the existing authority of the Board of Health, which in the abstract may seem vague or ambiguous, is still sufficiently flexible, effective, and amazingly powerful when appropriately applied to a particular situation. That is not to say that existing public health authority is sufficient to address any and all emergencies. In this case, however, the board's jurisdiction was adequate for the purpose it was used.

WNV has required the cooperation and coordination of many public and private partners, including governmental agencies that may not otherwise have interacted on a regular basis. WNV has brought the worlds of public health and environmental conservation together in a way that has sensitized both to the mission and complexities of the other.

Finally, it should be noted that law has greatly influenced WNV public health practice. Several bodies of law—from the federal mandates of the Clean Water Act and of the EPA-approved pesticide labels to the state requirements of SEQRA and the conditions of DEC permits, and the

juxtaposition of these with traditional public health legal principles such as Board of Health orders to abate nuisances—have guided and enabled the implementation of sound public health policy. The results—successfully containing the disease when initially there was concern for an uncontrolled spread, and going from 45 cases and 5 deaths in 1999 to 7 cases and no deaths in 2001—demonstrate how a knowledge and understanding of law can enhance, rather than obstruct, the practice of public health. ■

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Note. The views expressed are the author's and are not necessarily those of the Department of Health or the City of New York

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